

APPENDIX C. STATUS REPORT GEOGRAPHIC INFORMATION SYSTEM

Summary

A Geographic Information System (GIS) is being developed for both the Sacramento and San Joaquin River basins. The purpose of the GIS is to prepare base maps and figures, assist in the evaluation of the measures, and to conduct mapping analyses associated with the ecosystems functions model. A primary principle of the Study Team is to use existing data as much as possible. During Phase I of the Study, the team has accomplished the following:

- Identified specific GIS needs
- Evaluated existing data layers
- Acquired priority data layers
- Initiated efforts to acquire additional needed data
- Acquired needed software and hardware
- Initiated acquisition of additional hardware
- Initiated development of a long-term GIS management plan
- Coordinated with centers of GIS data and expertise (ongoing)

GIS Needs

Development of the GIS began by identifying the GIS information and analyses that would be needed by the Comprehensive Study. This stage was followed by a systematic effort to identify and evaluate existing data layers. Thus, the Study Team convened various meetings and workshops that included participants from the Study Team, interested parties from DWR, the Corps, FWS, and Jones and Stokes Associates. The Study Team also contracted with Jones and Stokes to review all existing GIS layers and those in development of potential interest to the Study. This information was captured in the report *Development of a Geographic Information System Framework - Part A - Existing Information*. Based upon these meetings, workshops, and the Jones and Stokes report, the Study Team determined what tasks the GIS would need to help accomplish and the required layers to facilitate those efforts. The tasks and layers are listed in Table C-1.

GIS Use

The GIS will provide many uses. From preparing base maps to evaluating the impacts of measures. The GIS is integral to the Ecosystem Functions Model described in Appendix D. One example is shown Figure C-1. This is a portion of the Sacramento River basin with levees and land use shown. Also indicated are those land uses designated as prime or unique farmlands. The GIS database also allows us to determine the types and amounts of land in our impact areas. Table C-2 shows the amounts of special status farmlands in both basins contained in the economic impact areas thus far identified for study. These are just two examples of the many types of information that the GIS database will make available to the Comprehensive Study Team.

Status of Data Layer Acquisition

The Study Team then identified eight priority data themes to be collected in an initial data-acquisition phase. These layers are listed below.

- Existing Project Levees (rivers and bypasses) and weirs
- FEMA Floodplains as modified by the Corps
- Land Use
- Riparian Vegetation
- Refuges and Conservation Lands
- Wetlands
- Special-Status Species Occurrences & Special-Status Plant Communities

Most of these layers were acquired in Fall 1998 and the source, scale, spatial extent, data quality, and data completeness were documented. Several of the layers, including DWR's Land Use and the FEMA Floodplains data, were used for economic analyses completed for the Post Flood Assessment. Following review of these layers, the Study Team identified limitations or gaps in data coverage. Efforts have begun to fill these gaps and to collect updated information.

The Study Team has acquired and begun processing the next set of priority layers. These layers will be used to prepare base maps, and include streams and roads, cities and towns, digital raster graphics, political boundaries, and population/census data. The latter data theme will be used by the Post Flood Assessment group to calculate populations at risk from flooding events. The status of layer acquisition is also shown in Table C-1.

Coordination

Coordination is important to ensure consistency and to avoid duplication of efforts. The Study Team is coordinating with several groups, such as DWR's District Offices; DWR's Information Systems and Services Office; California State University, Chico; Sacramento River Advisory Council; University of California at Davis and at Berkeley; the Resources Agency (CERES); and the U.S. Bureau of Land Management (BLM). These groups are providing GIS data and they also manage related GIS.

Metadata

The Resources Agency manages the California Environmental Resource Evaluation System (CERES), which includes the CERES MS Access Metadata Management System Database. This is a MS Access database to allow offline entry of metadata into the CERES Environmental Information Catalog, the California Geospatial Data Catalog, and other developed catalogs. The Study Team is working with this group to ensure that metadata is compatible with this format for inclusion these Statewide databases and for general consistency.

Software/Hardware

The platform for this GIS is ArcInfo and ArcView. These are software applications produced by Environmental Systems Research Institute (ESRI). These applications are widely used by many public agencies and allow spatial information to be exchanged with other common platforms. They also allow simple information display and enable complex spatial analyses to be performed. Data layers are being placed into a common geographical reference. A high-end workstation/server is being designated to store the geographic information and to execute spatial analyses and modeling. Peripheral hardware will include plotters, digitizing tablets, additional storage media, and a CD-writer.

Long-Term Management

The Study Team is addressing issues related to long-term GIS data storage and management and policies on information dissemination. A GIS management plan is being developed to address these issues and to catalog data layers, metadata, outline database management, and to document analyses performed.

TABLE C-1. GIS DATA LAYERS
SHADED LAYERS HAVE BEEN ACQUIRED.

TASK	DATA LAYER	COMMENTS	EXISTING DIGITAL DATA
Describe System	Existing project levees	Source: DWR	Yes
	Existing bypasses & weirs	Location of bypasses is part of levee database. Weirs are not shown.	Location of levees- yes. As-built data - no
	Existing bank protection	No maps of SJ River locations exist.	No digital data but hard maps of revetment on Sacramento River from Keswick-Verona exists
	"Major" diversions & weirs	Need to define threshold of diversion size	Probably; from several different sources
	Existing dams and reservoirs	Several sources	Yes
Prepare Base Maps	Streams & roads	Source: Teale	Yes
	Cities & towns	Source: DWR	Yes
	Digital raster graphics	License avail thru DWR	Yes
	Topography	Topography exists in Intergraph format, must be processed for GIS DTM	Yes; detailed topography needs integration into GIS
	Watersheds	H&H or FRRAP	Yes
	County boundaries	Teale	Yes
	Congress & State Leg. Districts	DWR	Yes
	Local Levee Maintaining Agencies	Part of DWR levee database	Yes
Identify Flooded Areas	Flooded areas: '83, '86, '95, '97	Layers prepared by contractor	No
Identify Levee Problems	Levee failure, overtopping, & seepage: '83,'86,'95	Would require extensive research of data	No
	Levee failure, overtopping, & seepage: '97	Done by Levee Rehabilitation Branch	Yes

TASK	DATA LAYER	COMMENTS	EXISTING DIGITAL DATA
Identify Levee Problems	SJ Basin Reconnaissance Report levee problem areas	Would have to be digitized from report	No
	Sac R. FC System Evaluation. levee work	Would require research and digitizing	No
Identify Levee Problems	SRBPP erosion sites	Ayres surveys	No, but some mapping exists
Identify Property at Risk	FEMA Floodplain	Floodplains do not match at all County Lines	No
	Economic Impact Areas	Done	No
Identify People at Risk	Population/ census	Block level data useful for FDA	Yes
Analyze H&H	Stream gage locations	H&H prepared	Yes
	River cross-sections	H&H to prepare	To come
	Photogrammetry survey photos	H&H prepared	Yes
	Floodplain simulations	H&H to prepare	To come
Develop Present Condition	Land Use	Source: DWR urban & agriculture	Yes
	Riparian vegetation	Various sources need integration; Northern SJ must be mapped	Yes, but gaps exist
	Refuges & conservation lands (exist & proposed)	Various sources need integration	Yes, but gaps exist
	Wetlands	NWI & DU	Yes
	State-designated floodways	Reclamation Board is source. Digitizing required	No
	Gravel mining operations - existing	CDMG	Yes
	Erosion/deposition - bank erosion threatening levees	Ayres surveys of potential SRBPP sites	No, but some mapping of Sacramento River sites exists.
	Erosion/deposition - bank migration areas/rates	Digital from DWR-North for mainstem only.	Sac R. Keswick-Verona reach only has data. N District database

TASK	DATA LAYER	COMMENTS	EXISTING DIGITAL DATA
Develop Present Condition	Erosion/deposition - bed aggradation/degradation	Sparse information	No
Develop Historical Condition	Historical vegetation	Soil maps provide surrogate for pre-settlement	Yes; 1930 basin wide and more recent Sac R. Keswick-Verona
	Historical river planform	See also "Erosion/deposition - bank migration areas/rates"	Yes, with gaps (Sac R. Verona-Delta & SJ R. Merced-Stockton)
	Gravel mining operations - historical		No
Develop Ecosystem Model	Quaternary geology	Digitizing required	No. Hard copy maps for Sacramento basin exist. Nothing for SJ
	Soils Maps	NRCS is digitizing county soils maps, but process is slow. Some done but very skimpy	No
	Remnant floodplain features/ historical wetlands	Could locate from topo & aerial photos and digitize; add condition data in field	No
	Low flow river plan form	H&H to prepare	To come
Develop Future Condition	Future land use	Could use county general plans. Some are being digitized but most have not been.	No
Evaluate Impacts	Prime & unique farmlands	Obtain from CDC	Yes
	Special-status species (incl. T&E) occurrences	DFG's NDDB	Yes
	Special-status communities	DFG's NDDB	Yes
	T&E species habitats	No region wide identification exists. Will not likely develop this as a layer.	No

TABLE C-2				
FARMLANDS OF SPECIAL SIGNIFICANCE IN THE ECONOMIC IMPACT AREAS				
COUNTY	FARMLAND OF LOCAL IMPORTANCE (Acres)	FARMLAND OF STATEWIDE IMPORTANCE (Acres)	PRIME FARMLAND (Acres)	UNIQUE FARMLAND (Acres)
BUTTE CO	0	0	15	0
COLUSA CO	0	0	0	0
FRESNO CO	4,147	2,865	12,103	1,004
GLENN CO	0	9,021	25,562	5
MADERA CO	6,942	15,543	35,796	43,538
MERCED CO	14,837	43,624	75,955	35,713
PLACER CO	0	33	85	8
SACRAMENTO CO	4,774	10,307	94,499	6,937
SAN JOAQUIN CO	1,815	13,442	80,876	3,751
SHASTA CO	251	540	6,377	50
SOLANO CO	0	4,202	22,537	928
STANISLAUS CO	1,640	1,807	19,458	2,110
SUTTER CO	0	61,068	137,901	277
TEHAMA CO	2,284	487	19,298	2,837
YOLO CO	331	9,550	92,677	1,396
YUBA CO	0	3,153	20,008	3,537